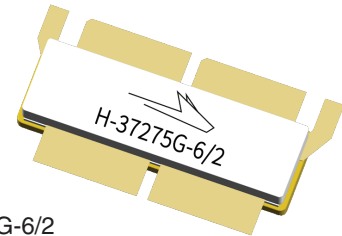


# PXAD214218FV

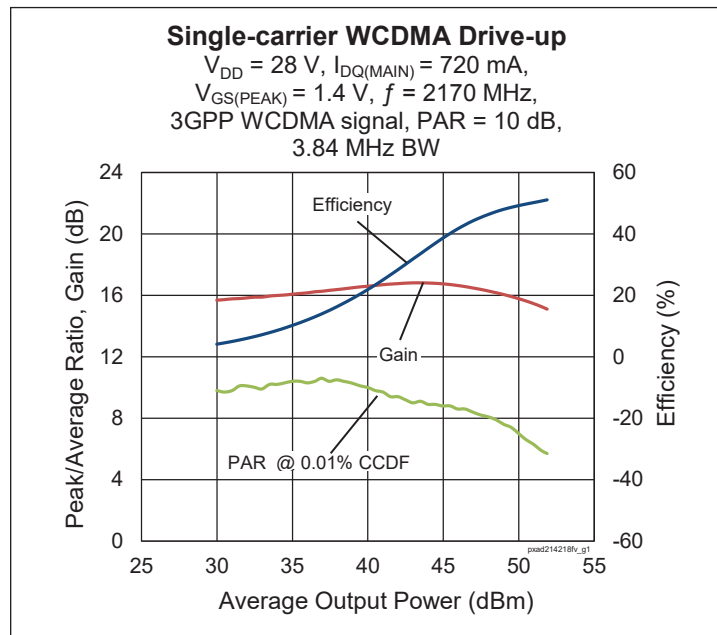
## Thermally-Enhanced High Power RF LDMOS FET 430 W, 28 V, 2110 – 2170 MHz

### Description

The PXAD214218FV is a 430-watt ( $P_{3dB}$ ) LDMOS FET with an asymmetrical design intended for use in multi-standard cellular power amplifier applications in the 2110 to 2170 MHz frequency band. Features include dual-path design, input and output matching, high gain and thermally-enhanced package with earless flanges. Manufactured with Wolfspeed's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.



PXAD214218FV  
Package H-37275G-6/2



### Features

- Broadband internal input and output matching
- Asymmetrical Doherty design
  - Main :  $P_{1dB} = 130\text{ W Typ}$
  - Peak :  $P_{1dB} = 290\text{ W Typ}$
- Typical Pulsed CW performance, 2140 MHz, 28 V, Doherty configuration
  - Output power at  $P_{3dB} = 436\text{ W}$
  - Efficiency = 55%
  - Gain = 13.5 dB
- Capable of handling 10:1 VSWR @28 V, 110 W (WCDMA) output power
- Integrated ESD protection
- Human Body Model class 2 (per ANSI/ESDA/ JEDEC JS-001)
- Low thermal resistance
- Pb-free and RoHS compliant

### RF Characteristics

#### Two-carrier WCDMA Specifications (tested in Wolfspeed Doherty production test fixture)

$V_{DD} = 28\text{ V}$ ,  $I_{DQ} = 720\text{ mA}$ ,  $V_{GS(PEAK)} = 1.5\text{ V}$ ,  $P_{OUT} = 56\text{ W avg}$ ,  $f = 2170\text{ MHz}$ , 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 10 dB @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Linear Gain	$G_{ps}$	15	16	—	dB
Drain Efficiency	$\eta_D$	45	48.7	—	%
Adjacent Channel Power Ratio	ACPR	—	-24.5	-22	dBc
Output PAR@0.01% CCDF	OPAR	6.1	7.4	—	dBc

All published data at  $T_{CASE} = 25^\circ\text{C}$  unless otherwise indicated

ESD: Electrostatic discharge sensitive device—observe handling precautions!

**DC Characteristics** (each side)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_{DS} = 10\text{ mA}$	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	$V_{DS} = 28\text{ V}, V_{GS} = 0\text{ V}$	$I_{DSS}$	—	—	1	$\mu\text{A}$
	$V_{DS} = 63\text{ V}, V_{GS} = 0\text{ V}$	$I_{DSS}$	—	—	10	$\mu\text{A}$
Gate Leakage Current	$V_{GS} = 10\text{ V}, V_{DS} = 0\text{ V}$	$I_{GSS}$	—	—	1	$\mu\text{A}$
On-State Resistance (Main)	$V_{GS} = 10\text{ V}, V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.09	—	$\Omega$
	(Peak) $V_{GS} = 10\text{ V}, V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.05	—	$\Omega$
Operating Gate Voltage (Main)	$V_{DS} = 28\text{ V}, I_{DQ} = 720\text{ mA}$	$V_{GS}$	2.3	2.7	2.9	V
	(Peak) $V_{DS} = 28\text{ V}, I_{DQ} = 0\text{ mA}$	$V_{GS}$	—	1.4	—	V

**Maximum Ratings**

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	65	V
Gate-Source Voltage	$V_{GS}$	-6 to +10	V
Junction Temperature	$T_J$	225	$^{\circ}\text{C}$
Storage Temperature Range	$T_{STG}$	-65 to +150	$^{\circ}\text{C}$

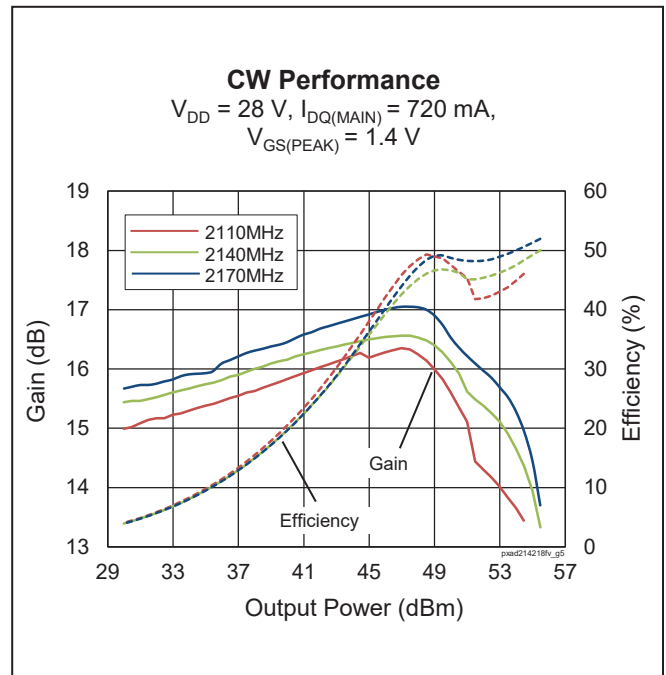
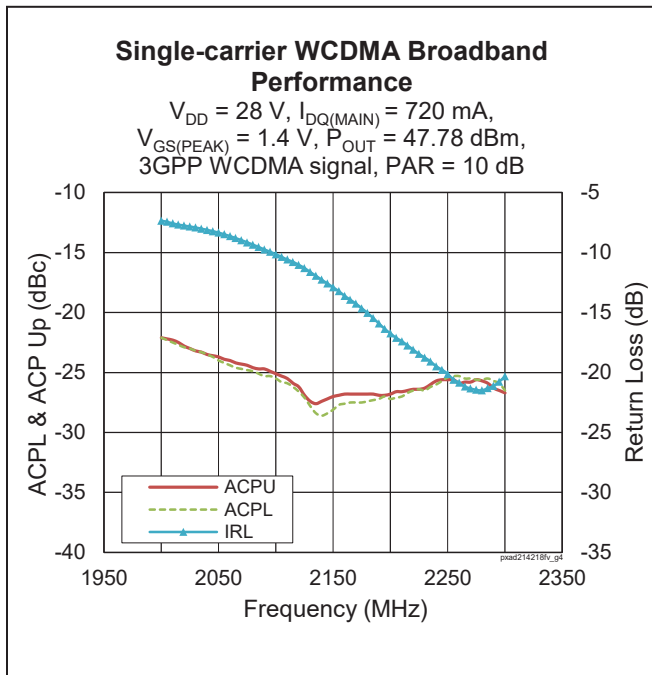
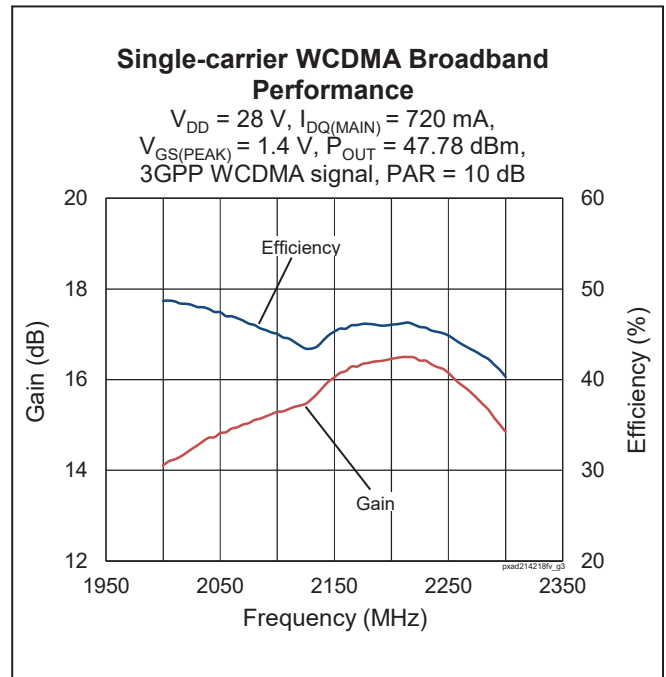
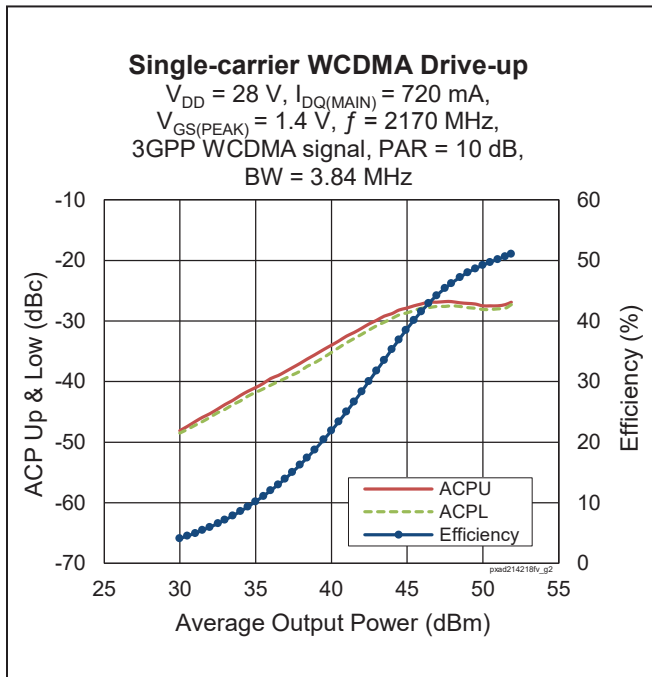
**Thermal Characteristics**

Parameter	Symbol	Value	Unit
Thermal Resistance (Main, $T_{CASE} = 70^{\circ}\text{C}$ , 60 W CW)	$R_{\theta JC}$	0.44	$^{\circ}\text{C}/\text{W}$
(Peak, $T_{CASE} = 70^{\circ}\text{C}$ , 280 W CW)	$R_{\theta JC}$	0.246	$^{\circ}\text{C}/\text{W}$

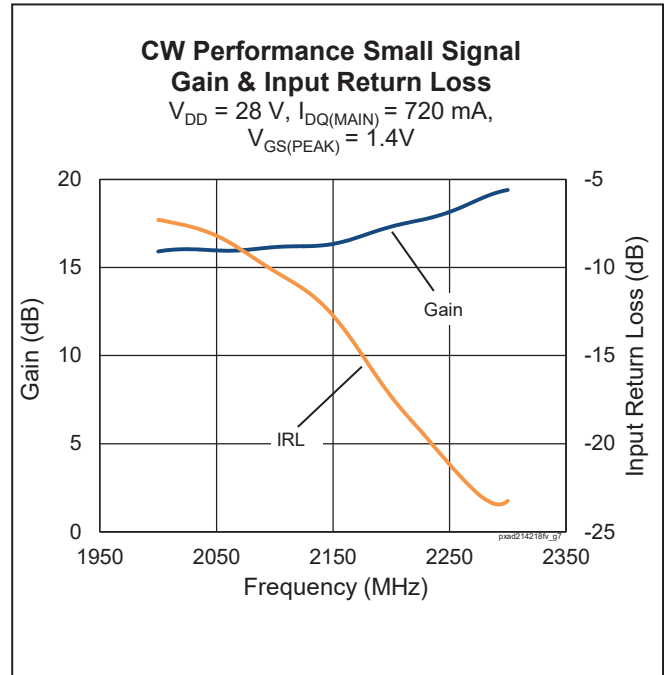
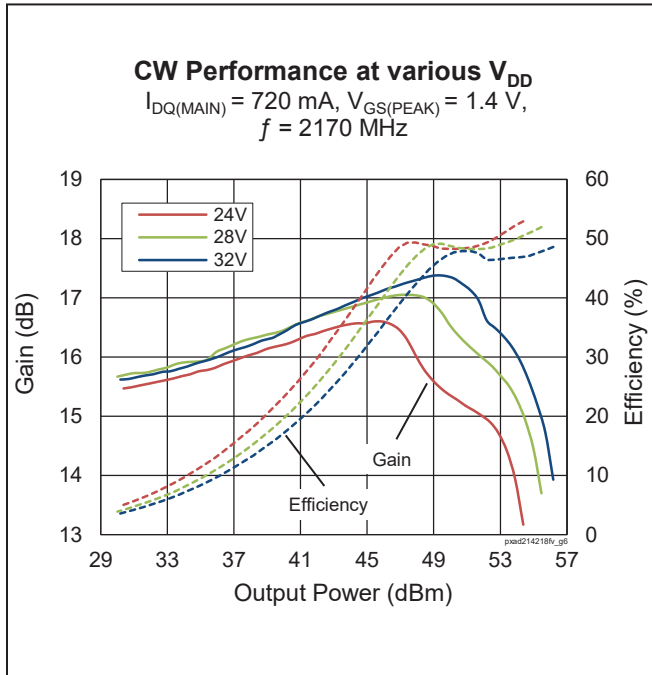
**Ordering Information**

Type and Version	Order Code	Package Description	Shipping
PXAD214218FV V1 R0	PXAD214218FV-V1-R0	H-37275G-6/2,	Tape & Reel, 50 pcs
PXAD214218FV V1 R2	PXAD214218FV-V1-R2	H-37275G-6/2,	Tape & Reel, 250 pcs

**Typical RF Performance** (data taken in production test fixture)



Typical RF Performance (cont.)



## Load Pull Performance

**Main Side Load Pull Performance** – Pulsed CW signal: 10  $\mu$ s, 10% duty cycle,  $V_{DD} = 28$  V,  $I_{DQ} = 960$  mA, class AB

		P <sub>1dB</sub>									
		Max Output Power					Max Drain Efficiency				
Freq [MHz]	Z <sub>s</sub> [ $\Omega$ ]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>1dB</sub> [dBm]	P <sub>1dB</sub> [W]	$\eta^D$ [%]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>1dB</sub> [dBm]	P <sub>1dB</sub> [W]	$\eta^D$ [%]
2110	3.7 - j8.1	1.4 - j3.7	19.7	52.58	181	57.3	2.7 - j3.1	21.7	51.21	132	65.8
2140	5.2 - j8.0	1.5 - j3.8	20.4	52.53	179	59.2	2.4 - j3.2	22	51.40	138	65.5
2170	7.2 - j9.5	1.4 - j3.8	19.7	52.60	182	57.7	2.2 - j3.1	21.5	51.43	139	65.1

		P <sub>3dB</sub>									
		Max Output Power					Max Drain Efficiency				
Freq [MHz]	Z <sub>s</sub> [ $\Omega$ ]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>3dB</sub> [dBm]	P <sub>3dB</sub> [W]	$\eta^D$ [%]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>3dB</sub> [dBm]	P <sub>3dB</sub> [W]	$\eta^D$ [%]
2110	3.7 - j8.1	1.4 - j3.8	17.6	53.26	212	58.4	2.7 - j3.0	19.8	51.79	151	67.1
2140	5.2 - j8.0	1.4 - j4.0	17.8	53.22	210	56.7	2.6 - j3.0	20.2	51.76	150	67.4
2170	7.2 - j9.5	1.5 - j4.2	17.7	53.28	213	59.4	2.5 - j2.8	19.9	51.64	146	67.3

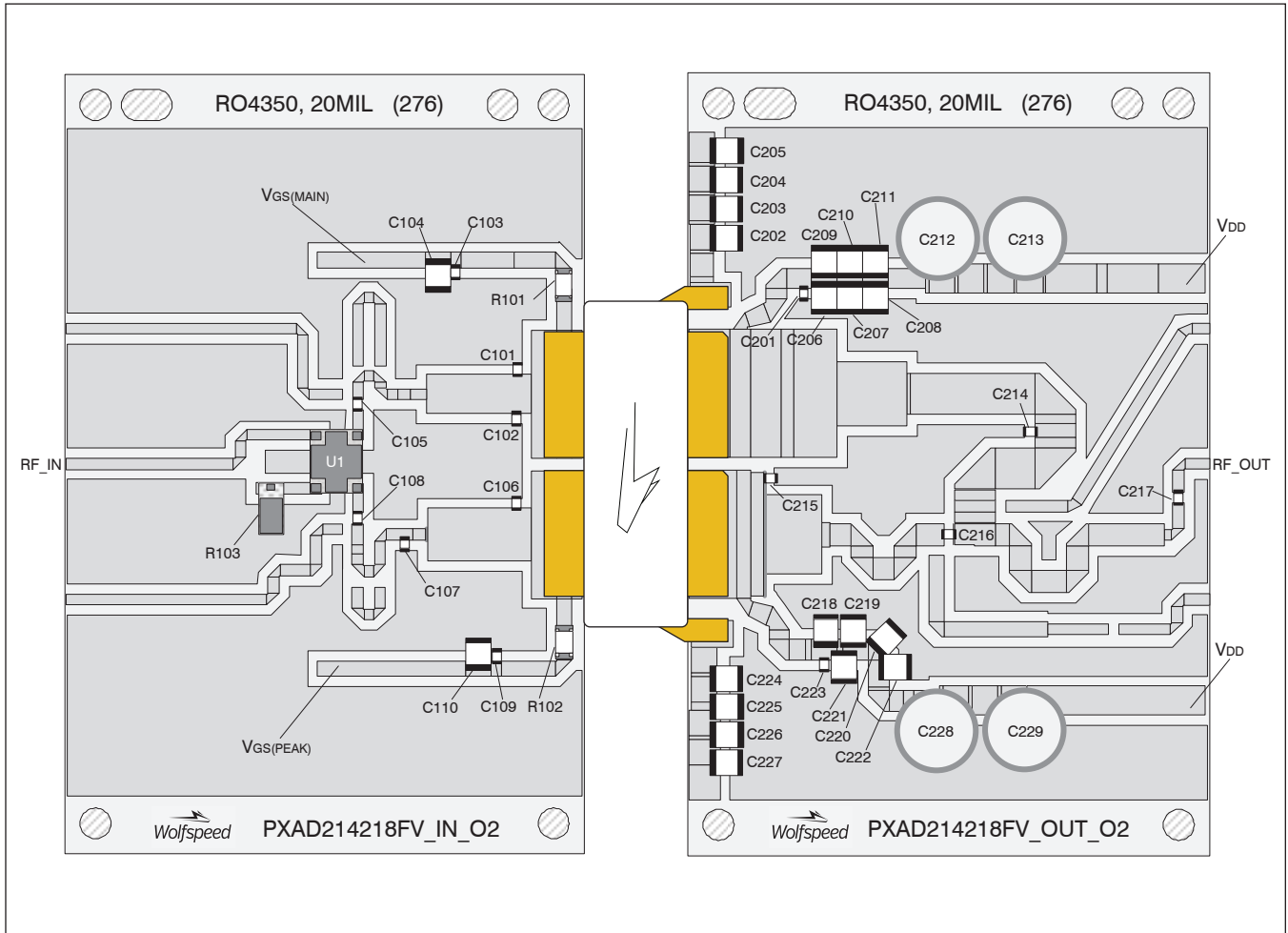
**Peak Side Load Pull Performance** – Pulsed CW signal: 10  $\mu$ s, 10% duty cycle,  $V_{DD} = 28$  V,  $I_{DQ} = 10$  mA, class B

		P <sub>1dB</sub>									
		Max Output Power					Max Drain Efficiency				
Freq [MHz]	Z <sub>s</sub> [ $\Omega$ ]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>1dB</sub> [dBm]	P <sub>1dB</sub> [W]	$\eta^D$ [%]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>1dB</sub> [dBm]	P <sub>1dB</sub> [W]	$\eta^D$ [%]
2110	3.0 - j6.2	2.3 - j5.8	16.2	55.39	346	54.0	3.4 - j3.3	17.6	53.62	230	65.2
2140	4.0 - j6.1	2.6 - j6.1	16.6	55.43	349	55.1	3.0 - j3.3	18	53.46	222	65.1
2170	5.0 - j5.3	2.9 - j6.7	16.2	55.33	341	52.8	3.1 - j3.0	17.8	53.00	200	64.9

		P <sub>3dB</sub>									
		Max Output Power					Max Drain Efficiency				
Freq [MHz]	Z <sub>s</sub> [ $\Omega$ ]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>3dB</sub> [dBm]	P <sub>3dB</sub> [W]	$\eta^D$ [%]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>3dB</sub> [dBm]	P <sub>3dB</sub> [W]	$\eta^D$ [%]
2110	3.0 - j6.2	2.6 - j6.2	14.1	56.13	410	56.1	3.2 - j3.7	15.7	54.55	285	65.4
2140	4.0 - j6.1	2.8 - j6.6	14.2	56.13	410	55.3	3.4 - j3.9	15.8	54.64	291	65.7
2170	5.0 - j5.3	3.0 - j6.8	14.1	56.03	401	54.7	3.2 - j4.0	15.8	54.59	288	65.0



### Reference Circuit, 2110 – 2170 MHz



Reference circuit assembly diagram (not to scale)



**Reference Circuit** (cont.)

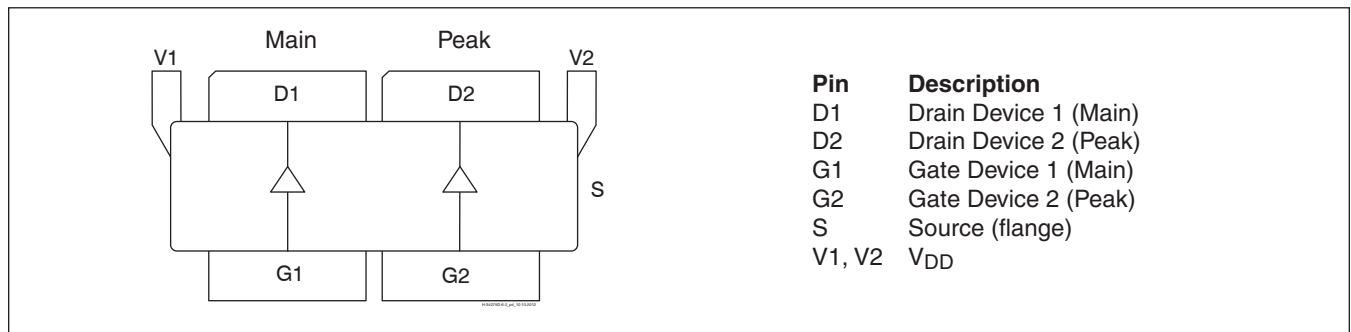
**Reference Circuit Assembly**

DUT	PXAD214218FV V1
Test Fixture Part No.	LTA/PXAD214218FV V1
PCB	Rogers 4350, 0.508 mm [0.020"] thick, 2 oz. copper, $\epsilon_r = 3.66$ , $f = 2110 - 2170$ MHz
Find Gerber files for this test fixture on the Wolfspeed Web site at <a href="http://www.wolfspeed.com/RF">http://www.wolfspeed.com/RF</a>	

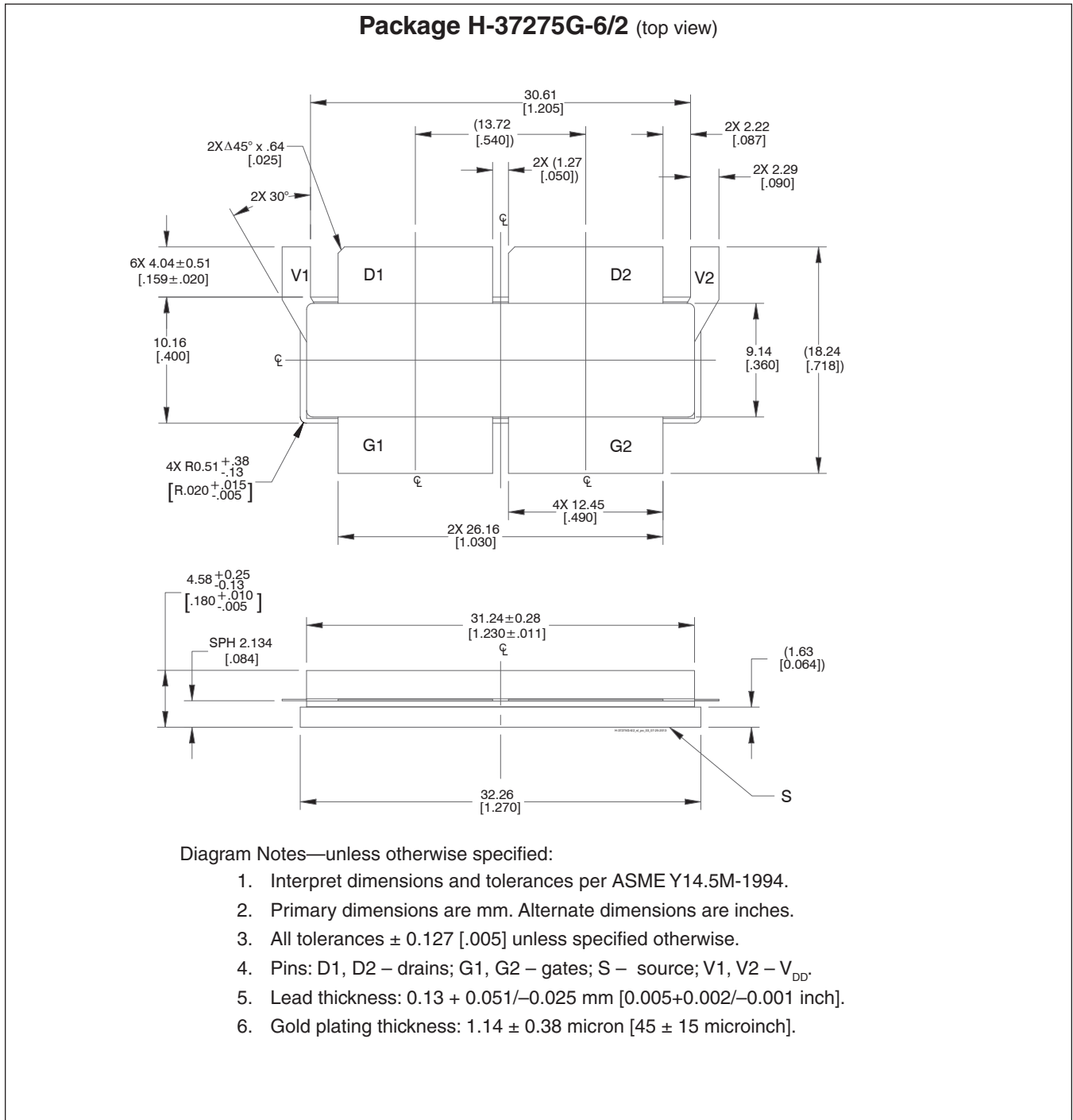
**Components Information**

Component	Description	Manufacturer	P/N
<b>Input</b>			
C101, C102, C106	Capacitor, 0.5 pF	ATC	ATC800A0R5CT250T
C103, C105, C108, C109	Capacitor, 18 pF	ATC	ATC800A180JT250T
C104, C110	Capacitor, 10 $\mu$ F	Taiyo Yuden	UMK325C7106MM-T
C107	Capacitor, 0.4 pF	ATC	ATC800A0R4CT250T
R101, R102	Resistor, 5.6 ohms	Panasonic Electronic Components	ERJ-8RQJ5R6V
R103	Resistor, 50 ohms	Richardson	C16A50Z4
U1	Hybrid Coupler	Anaren	X3C21P1-04S
<b>Output</b>			
C201, C216, C217, C223	Capacitor, 18 pF	ATC	ATC800A180JT250T
C202, C203, C204, C205, C206, C207, C208, C209, C210, C211, C218, C219, C220, C221, C222, C224, C225, C226, C227	Capacitor, 10 $\mu$ F	Taiyo Yuden	UMK325C7106MM-T
C212, C213, C228, C229	Capacitor, 220 $\mu$ F	Panasonic Electronic Components	EEE-FP1V221AP
C214	Capacitor, 0.3 pF	ATC	ATC800A0R3CT250T
C215	Capacitor, 1.2 pF	ATC	ATC800A1R2CT250T

**Pinout Diagram** (top view)



Package Outline Specifications







## Revision History

Revision	Date	Data Sheet Type	Page	Subjects (major changes since last revision)
01	2016-04-20	Advance	All	Data Sheet reflects advance specification for product development
02	2016-11-07	Production	All	Data Sheet reflects released product specification
02.1	2016-12-07	Production	1, 5	Revised typo in Features, revised PAE to Drain Eff in Load Pull performance
02.2	2017-03-30	Production	1 3. 4	Updated RF Characteristics table Fixed missing labels on CW performance graphs
03	2018-07-02	Production	All	Converted to Wolfspeed Data Sheet

For more information, please contact:

4600 Silicon Drive  
 Durham, North Carolina, USA 27703  
[www.wolfspeed.com/RF](http://www.wolfspeed.com/RF)

Sales Contact  
[RFSales@wolfspeed.com](mailto:RFSales@wolfspeed.com)

RF Product Marketing Contact  
[RFMarketing@wolfspeed.com](mailto:RFMarketing@wolfspeed.com)  
 919.407.7816

## Notes

---

### Disclaimer

Specifications are subject to change without notice. Cree, Inc. believes the information contained within this data sheet to be accurate and reliable. However, no responsibility is assumed by Cree for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Cree. Cree makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose. “Typical” parameters are the average values expected by Cree in large quantities and are provided for information purposes only. These values can and do vary in different applications and actual performance can vary over time. All operating parameters should be validated by customer’s technical experts for each application. Cree products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Cree product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.